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**Natural Resource Economics Division**

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## ANALYZING LEVELS OF FOREIGN INVESTMENT IN U.S. AGRICULTURAL LAND

ERS STAFF REPORT No. AGES821123

T. Alexander Majchrowicz

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Natural Resource Economics Division
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## ABSTRACT

Geographic clustering of foreign investment in U.S. agricultural land is observed in maps when investment data are distributed by county. Multiple regression techniques performed to test for relationships between foreign investment and readily available agricultural and economic variables do not adequately explain the variation in levels of foreign ownership among counties. The low explanatory power of the variables suggests that 1) foreign investors appear not to represent a unique subset of owners of agricultural real estate or 2) factors other than those tested may better explain the variation in foreign investment levels among counties.

Key words: Agricultural land; foreign investment; foreign landownership.



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T. Alexander Majchrowicz*

## INTRODUCTION

Geographic clustering of foreign investment in U.S. agricultural land is observable in maps when investment data are distributed by county. Agricultural and economic variables from readily available data sources do not adequately explain the variation in county levels of this foreign investment. The use of multiple regression techniques, which test for relationships between foreign landownership and conventional agricultural and economic variables, explain the variation in investment levels among counties only to a limited degree. The low explanatory power of the regression model developed suggests that 1) foreign investors appear not to represent a unique subset of owners of U.S. agricultural real estate or 2) factors other than those tested may better explain the variation in foreign investment levels among counties.

The multiple regression model developed is

$$Y_n = B_o + B_1X_1 + B_2X_2 + B_3X_3 \ldots B_nX_n + u_n$$

where the dependent variable, $Y_n$, is some county-level measure of foreign investment in farmland calculated from data collected under the Agricultural Foreign Investment Disclosure Act of 1978. The independent variables, $X_n$, are county characteristic and economic factors, such as measures of agricultural productivity, tenure arrangements, and labor intensity, contained in the 1978 Census of Agriculture and the 1947-1977 County-City Data Book. The u terms are random disturbances which measure the discrepancy in the approximation of the linear equation. Variations of the regression equation are formed through

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use of alternate measures of the dependent variable to reflect absolute and proportional amounts of foreign-held farmland acreage.

Perceived Problem of Foreign Investment--During the late seventies the public and their legislators perceived threats to farming and farmland ownership in the United States from the influx of foreign investment in U.S. agricultural land. Farm organizations, the press, and the public expressed fears that wealthy foreign investors entering the agricultural land market would increase land values and subsequently deprive U.S. farmers of the opportunity to buy farmland at a reasonable price. These groups also asserted that foreign investors would have little concern for rural communities, threaten the existence of the family farm, and begin control of U.S. food production.

One of the first reports attempting to assess the magnitude of foreign investment in U.S. farmland, "Foreign Direct Investment in the United States," was published by the U.S. Department of Commerce in April 1976. The report estimated 4.9 million acres of U.S. land owned by nonresident aliens in 1975. In July 1978, the U.S. General Accounting Office (GAO) issued a report on a survey of foreign ownership of farmland in 25 counties in 5 States. The report, "Foreign Ownership of U.S. Farmland-Much Concern, Little Data," gave some ownership data but the estimate of total foreign landownership in the United States was deemed to be unreliable by the GAO.

To better monitor the level and assess the impacts of foreign investment in U.S. agricultural land, Congress passed the Agricultural Foreign Investment Disclosure Act of 1978 (AFIDA).[1/] The AFIDA legislation requires all foreign persons who own U.S. agricultural land, defined in the Act as all land used for agriculture, forestry, or timber production purposes, to report their

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1/ Pub. L. No. 95-460, 7 U.S.C. §§3501-3508 (Supp. II 1978).

holdings to the U.S. Department of Agriculture (USDA). Foreign persons are defined by the Act to include any individual who 1) is not a U.S. citizen or national, 2) is not a citizen of the Northern Mariana Islands or the Trust Territories of the Pacific Islands, or 3) is not lawfully admitted into the United States for permanent residence. Foreign governments, entities which are created under the laws of or have their principal place of business in a foreign country, and U.S. entities in which there is a direct or indirect significant foreign interest or substantial control are also defined as foreign persons. The regulations[1/] define "significant interest or substantial control" to mean a 5-percent or more interest in the entity.

Data collected by USDA under AFIDA indicated approximately 12.7 million acres of agricultural land owned by foreign investors as of December 31, 1981 (3). Foreigners reported owning farmland in all the States except Rhode Island. The West, South, and Northeast had the greatest amounts of foreign-held acreage. The six States with the highest levels of foreign-owned agricultural land at the end of 1981 were Maine (2,646,905 acres), Georgia (900,570 acres), California (846,713 acres), Texas (798,616 acres), New Mexico (660,763 acres) and Alabama (578,225 acres).

Although certain States may have high levels of foreign landownership, much of the investment may be concentrated in several counties of each State. For example, although the AFIDA data indicate Maine to have the highest level of foreign-owned agricultural land among the States, examination of the data at the county level reveals that 96 percent of the foreign-held acreage is in several timber producing counties. The alternate observation, that States

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1/ 7 C.F.R. §§781.1-.5 (1981). See 7 C.F.R. §§2.21(b)(34), .27(b)(15), .65(a)(34) and .85(a)(15) (1981) for the delegation of authority.

with a low level of foreign landownership could have counties with high concentrations of foreign-held agricultural land, may be true also. Therefore, analysts would be incorrect in viewing Statewide incidence levels of foreign investment provided by AFIDA data as indicative of the location, or type of agricultural activity, in which investment is occurring in the United States. In Maine, for example, analysts using Statewide data could assume that potato producing areas of the State were being seized by foreign investors. This assumption would be incorrect because the majority of investment was in several timber producing counties. Thus, to accurately examine the location of foreign investment in U.S. agricultural land, analysis of the investment must be made at a descriptive level which is more location specific than provided by Statewide data.

Relationships Tested--This study attempts to explain the variation in amounts of foreign-held acreage among counties through tests for relationships between foreign investment in U.S. agricultural land and readily available agricultural and economic variables. The study attempts to answer the questions 1) what features of a county are associated with a large quantity or high rate of foreign ownership, 2) do foreign persons represent a unique subset of investors in agricultural land, and, more specifically, 3) is it possible with the aid of readily available agricultural and economic data to predict the areas in which foreign investors will most likely acquire agricultural land? The multiple regression model developed to explain the variation in investment among counties utilizes three county-level data sources; investment data from the Agricultural Foreign Investment Disclosure Act of 1978, agricultural and economic variables from the 1978 Census of Agriculture, and economic variables from the 1947-1977 County-City Data Book.

Geographical Distributions--The county-level locational information contained in the AFIDA data base will answer the question of where foreign investment has occurred. Therefore, the data reported under AFIDA through December 31, 1980,[1/] were calculated to give levels of foreign investment in agricultural land by county. AFIDA provides foreign investment data for all 50 States plus Guam and Puerto Rico. Guam and Puerto Rico were eliminated from this study because data were not available for these locations from the Census of Agriculture and City-County Data Book.

An initial dot map distribution was made by county of all foreign-owned acreage reported under AFIDA through the end of 1980 (Figure 1). This analysis provides a geographical distribution of the foreign-held U.S. agricultural land which is more location specific than previously provided by State-level AFIDA data. The most predominant clustering of foreign-owned acreage is shown in the Northeast and Southeast with smaller areas of concentrated investment throughout the United States. Much of the investment in the Northeast and Southeast is explained by large forest land holdings. In addition to forest land, the Southeast, particularly southeastern Tennessee, has large acreage reported by mining companies as nonagricultural land[2/] under AFIDA. Forest and nonagricultural land in the AFIDA data comprise nearly 43 percent of the 7.8 million acres of foreign-held agricultural land reported by December 31, 1980 (2).

In order to provide comparability among data sources, farmland is defined in this study as land reported by AFIDA which is used for crop, pasture, or

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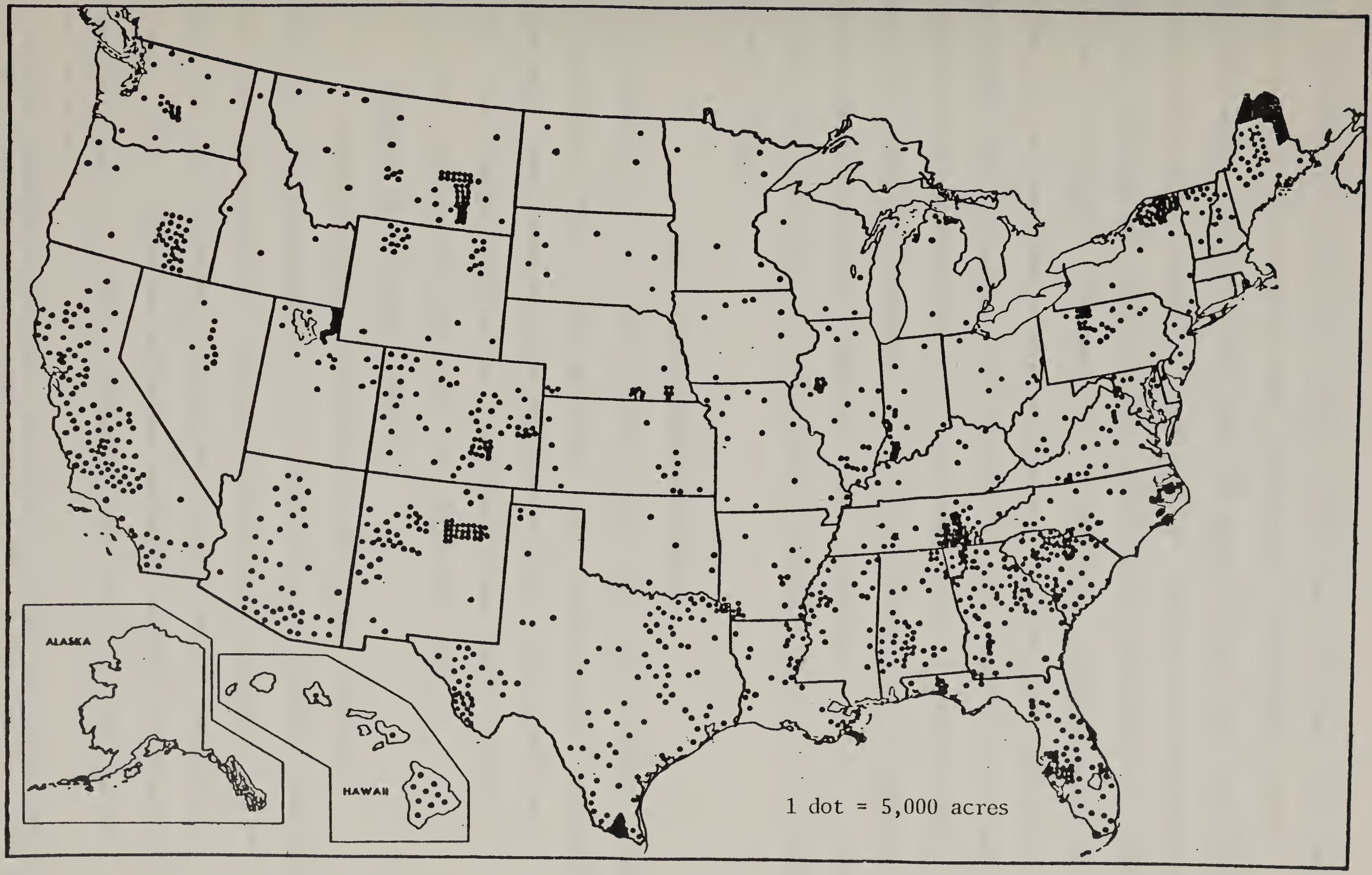
1/ At the time data files for this study were completed, the 1981 data reported in the introduction were not available.

2/ Nonagricultural land under AFIDA includes idle land that was used for agricultural purposes within 5 years prior to the acquisition date of the land by the foreign buyer.

Figure 1--Acres of Foreign-Owned U.S. Agricultural Land Through December 31, 1980



other agricultural purposes (for example, orchards and vineyards). This definition is much narrower than the term "agricultural land" defined in AFIDA. AFIDA data include acreage in forest land and nonagricultural land, but Census of Agriculture excludes acreage in these land-use categories from its farmland data. Only woodland and nonagricultural land commonly associated with a farm operation are included in the Census data. Therefore, to appropriately test for the relative importance of selected farmland variables from Census data, AFIDA records reporting acreage solely as forest land, nonagricultural land, or forest land and nonagricultural land were eliminated. A geographic distribution of the remaining investment, or the foreign-owned acres of farmland per county, is shown by Figure 2. Comparing this distribution to Figure 1, noticeable reductions in the amount of foreign-held acreage are evident in the Northeast and Southeast.

## THE MULTIPLE REGRESSION MODEL

In the model, $Y_n = B_o + B_1X_1 + B_2X_2 + B_3X_3 \ldots B_nX_n + u_n$, designed to describe the relationship between certain agricultural and economic factors and foreign-held acreage, three measures of the dependent variable, $Y_n$, are utilized:

$Y_1$ = the foreign (AFIDA) acres of farmland in the county, "AFIDAFL;"

$Y_2$ = the ratio of the foreign-held acreage in the county, $Y_1$, to all farmland in the county, "RATIO;"

$Y_3$ = the number of AFIDA reports filed in the county, "NUMAFIDA."

$Y_1$ and $Y_3$ are alternate measures of the absolute amount of foreign investment. $Y_2$ is a proportional measure. Values of the independent variables, $X_n$, were obtained from the 1978 Census of Agriculture and the 1947-1977 County-City Data Book. Table 1 lists the independent variables included in the model and the expected sign of the partial regression coefficients[1/] in each equation.

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1/ A partial regression coefficient expresses the effect of a single independent variable on the dependent variable when all other independent variables are held constant.

Figure 2--Acres of Foreign-Owned U.S. Farmland Through December 31, 1980

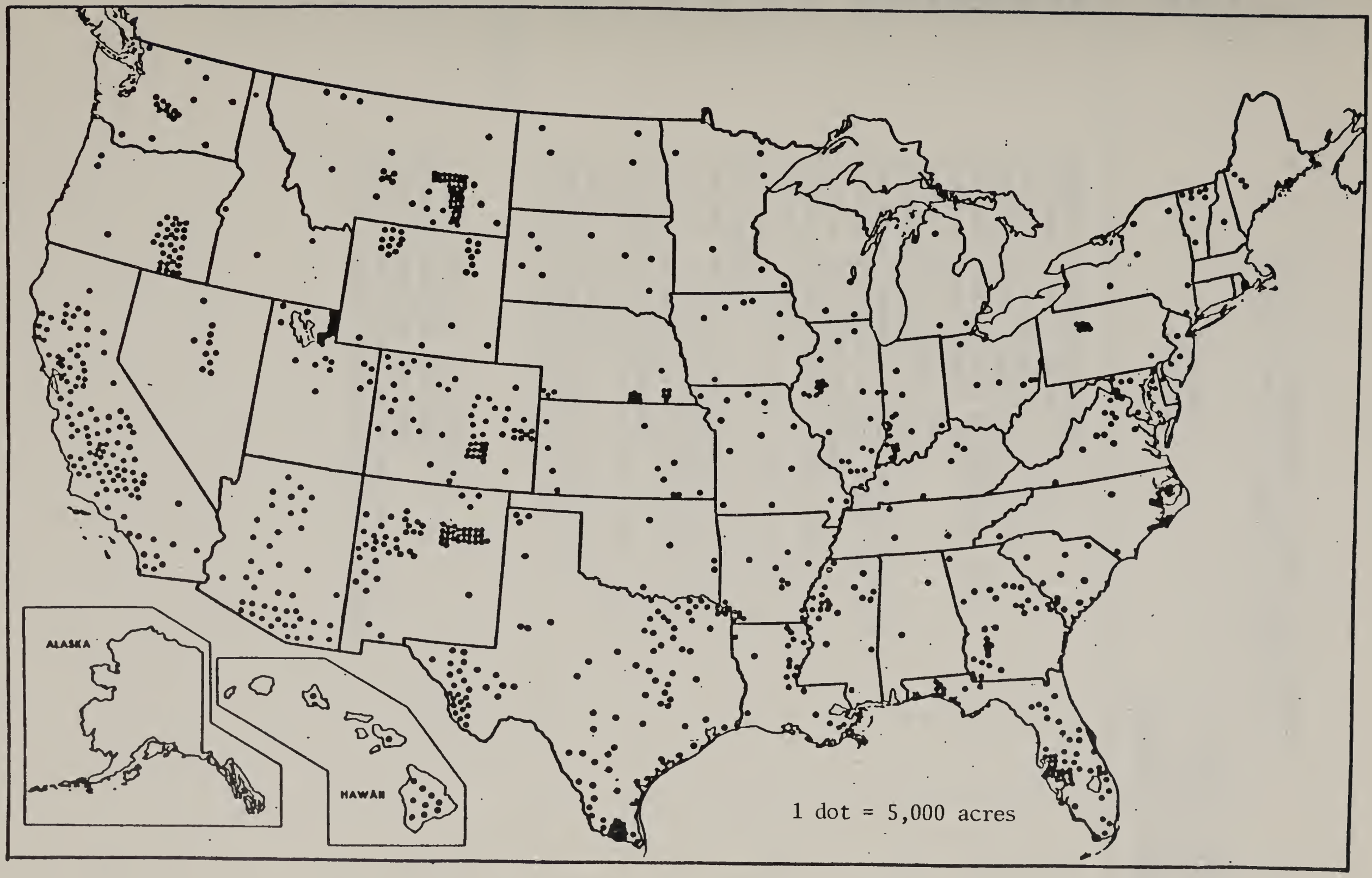

Table 1--List of independent variables and expected signs of partial regression coefficients

| Variable name | Independent variable | Expected sign of partial regression coefficient | | |
|---|---|---|---|---|
| | | Dependent variables | | |
| | | $Y_1$ | $Y_2$ | $Y_3$ |
| NBRFARMS | Number of farms in county | + | - | + |
| AVGSIZE | Average size of farms in county | + | + | + |
| OPAVGAGE | Operator's average age | - | - | - |
| POPSQMI | Population per square mile, 1975 | - | - | - |
| PCTFSTCK | Percent foreign-born population, 1970 | + | + | + |
| PCTUNEMP | Percent unemployment, 1970 | - | - | - |
| MEDINFRM | Median farm income, 1969 | + | + | + |
| PROPTAX | Property tax rate, 1971-72 | - | - | - |
| PCTFRMR | Number of farmers to all farms in county | - | - | - |
| PCTOP100 | Percent operators working 100+ days off farm to all farms in county | + | + | + |
| PCTSALES | Percent farms with $100,000+ sales to all farms in county | + | + | + |
| PCTGRAIN | Percent value of grain sold to value of all products | + | + | + |
| PCTCOTTN | Percent value of cotton and cottonseed sold to value of all products | - | - | - |
| PCTCATTL | Percent value of cattle and calves sold to value of all products | + | + | + |
| PCTRENT | Land of part owners plus tenants to all county farmland | + | + | + |
| CNTYSTAV | Average value of land in county to average value of land in State | + | + | + |
| Dummy variables: | | | | |
| NORTHE | Land located in the Northeast | - | - | - |
| SOUTH | Land located in the South | + | + | + |
| WEST | Land located in the West | + | + | + |
| ALIEN | State restrictions on alien ownership | - | - | - |
| CORP | State restrictions on corporate ownership | - | - | - |

Hypothesized Relationships--The independent variable to measure the number of farms in the county, "NBRFARMS," is included to account for the natural relation between the number in a subpopulation (foreign-owned acres) and the number in the parent population (county farmland acres). Other things being equal, $Y_1$ and $Y_3$ should increase if the number of farms, and most likely the availability of farmland, increases. The change in $Y_2$ is more difficult to predict because of the unknown degree of change in $Y_1$ caused by a change in "NBRFARMS." However, if an increase in "NBRFARMS" causes a less than proportional change in foreign landownership compared to the increase in county farmland, $Y_2$ should decrease with an increase in "NBRFARMS."

Average size of farms, "AVGSIZE," is an indicator of the size of the agricultural tract desired by foreign buyers. Many classes of foreign buyers of agricultural land have large amounts of money to invest (7). These investors should prefer large tracts of land in which to place their accumulated funds. Further, the absentee foreign owner may prefer larger operational farm units over smaller add-on units because of leasing and management factors. Therefore, all Y variables should increase as "AVGSIZE" increases.

Operator's average age, "OPAVAGE," is hypothesized to be greater for owner-operators than for operators of absentee-owned land. Tenant operators are usually young farmers, short of capital necessary to purchase land, and probably willing to work longer hours for lower wages. If foreign buyers tend to acquire younger operators as renters, a decrease in all Y variables is expected as "OPAVAGE" increases.

A high population per square mile, "POPSQMI," would likely indicate more urbanized communities with less available farmland. Foreign investors interested in farmland should naturally prefer rural areas, thus $Y_1$ and $Y_3$ are hypothesized

to decrease as "POPSQMI" increases. The effect of "POPSQMI" on $Y_2$ may be positive, negative, or neutral depending on the change in $Y_1$ caused by a change in "POPSQMI."

Percent foreign stock, "PCTFSTCK," as defined by the County-City Data Book, comprises the foreign-born population and the native population of foreign or mixed parentage in the county. Foreign investors are hypothesized to be attracted to areas where the citizens are of the same or complementary nationality. The foreign investors may be friends or relatives of local residents or simply seeking an area where people are of a similar heritage. If this hypothesis is true, an increase in "PCTFSTCK" should increase all Y variables.

High unemployment among comparable rural areas may denote economically depressed localities. Because foreign investors prefer more desirable properties that will produce income over time (8), distressed areas would not attract foreign investors who are seeking to maximize the return on their farmland investment. Thus, the percent unemployment, "PCTUNEMP," should be negatively related to all Y variables.

Median farm income, "MEDINFRM," measures the economic well-being of the farm sector in the county. Again, if foreign investors prefer areas with a high level of economic well-being, as "MEDINFRM" increases all Y variables should increase.

The property tax rate, "PROPTAX," is hypothesized to have a negative effect on all Y variables because foreign investors, similar to domestic investors, desire to minimize taxes paid. Low taxes may also suggest the lack of public services. Alternatively, the effect of tax rates may be reflected in lower land prices and thus figure little in the investor's decision to own land.

The ratio of operators, whose principal occupation is farming, to all farms, "PCTFRMR," may be an indicator of the agricultural operations in the county. That is, certain types of agriculture, such as grain operations, require part-time attention and a limited level of management. This type of agriculture would allow operators to have principal occupations other than farming. Because foreign investors tend to acquire farms with low labor and management requirements, all Y variables should decrease as "PCTFRMR" increases.

The percentage of operators working 100 or more days off farm to all farms in the county, "PCTOP100," is an alternate measure of the type of farm operations in the county. Cash grain farms require less operator's labor and management than other types of farms, thus, allowing grain operators to have other occupations. Here all Y variables are expected to increase a "PCTOP100" increases.

The percentage of farms with $100,000 or more in sales to all farms in the county, "PCTSALES," is an alternate measure of farm size. The hypothesis that foreign investors prefer large parcels should cause all Y variables to increase as "PCTSALES" increase.

The percentage value of grain sold to the value of all products sold in the county, "PCTGRAIN," is an indicator of type of farming in the county. Foreign investors are hypothesized to prefer annual cash grain crops (4) because of their low management requirements and associated short-term leasing agreements. Therefore, all Y variables should increase as "PCTGRAIN" increases.

The percentage of cotton and cotton seed sold to the value of all products sold in the county, "PCTCOTTN," is a similar measure to "PCTGRAIN." However, cotton requires close supervision and may be a crop unfamiliar to the predominant types of foreign investors. Foreign investors may tend to avoid unfamiliar crops

requiring close supervision, therefore, an increase in "PCTCOTTN" should decrease all Y variables.

The percentage of cattle and calves sold to the value of all products sold in the county, "PCTCATTL," is similar to the variables "PCTGRAIN" and "PCTCOTTN." Ranching operations utilize hired labor which would permit off-farm ownership. The hypothesis is that an increase in "PCTCATTL" should increase all Y variables.

The percentage of farmland rented to all farmland in the county, "PCTRENT," would reflect the type of agricultural operations in the county. Counties that have a high percentage of tenants as farm operators would suggest farm operations that require a low level of management. Foreign investors are hypothesized to perfer operations with low management requirements, thus, areas with a high degree of renters. For this reason, all Y variables are expected to increase as "PCTRENT" increases.

The average value of land in the county to the average value of land in the State, "CNTYSTAV," is hypothesized to increase all Y variables as "CNTYSTAV" increases. This hypothesis is justified by the desire of foreign investors to buy more productive land in the State for a satisfactory rate of return on their investment.

Regional characteristics of foreign investment are represented by three dummy variables. The variables indicate whether or not the land is located in the Northeast, "NORTHE;" South, "SOUTH;" or West, "WEST."[1/] In all cases, a

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1/ The Northeast region includes Maine, New Hampshire, Vermont, Massachusetts. Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia. The North Central region includes Michigan, Wisconsin, Minnesota, Ohio, Indiana, Illinois, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas. The South includes Virginia, West Virginia, North Carolina, South Carolina, Kentucky, Tennessee, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas. The West includes Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, and Hawaii.

value of 1 was assigned if the land is located in the region and a 0 value if it is not. The North Central region serves as the reference category and was assigned all 0 values. These variables are included to account for factors, such as attitude of local government toward foreign investment, quality of public services, climatic qualities, aesthetics, and cultural amenities, that are unique to a particular area and which could affect the level of investment in that area. Although most foreign investors are absentee owners, these investors realistically should prefer more appealing areas because of periodic visits or the possibility of eventually establishing residency on the property. Based on the distribution in Figure 2, "SOUTH" and "WEST" should have a positive effect on all Y variables; "NORTHE" a negative effect.

State restrictions on landownership are represented by a dummy variable also. The variable, "ALIEN," indicates whether or not there are restrictions on alien ownership of farmland. A value of 1 was assigned to positive answers; 0 otherwise. States having significant alien restrictions are Connecticut, Illinois, Indiana, Iowa, Kentucky, Minnesota, Mississippi, Missouri, Nebraska, North Dakota, Oklahoma, Pennsylvania, South Dakota, and Wisconsin (6). The presence of alien restrictions should have a negative effect on all Y variables.

Another dummy variable, "CORP," indicates whether or not there are State restrictions on corporate ownership. Again, a value of 1 indicated yes; 0 no. States restricting corporate ownership of farmland are Iowa, Kansas, Kentucky, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, Texas, and Wisconsin (6). Existance of corporate restrictions may have a negative effect on all Y variables.

Data Files--The systems file created by merging the data files from AFIDA, Census of Agriculture (COA), and County-City Data Book (CCDB) contains counties

in which data were available for all three files. That is, using the AFIDA file as a base containing all counties, only counties having data available in the COA and CCDB files were matched to the AFIDA file counties. If either the COA or CCDB file lacked data for a county, that county was eliminated from the systems file utilized in this study. Eliminated counties included those which had no agricultural land. This procedure yielded 1,604 valid counties. Some level of AFIDA acreage was reported in 1,249 of these counties.

Application of the Model--The model was applied separately to the data for all 1,604 counties (including counties with zero acres of AFIDA farmland) and for the 1,249 counties having only positive amounts of AFIDA farmland. Analysis of each independent variable in the model tests the hypothesis that the regression coefficients equal 0, $H_o:B_n = 0$, against an alternate hypothesis, $H_a:B_n \neq 0$. If the estimated coefficients are significantly different from 0, $H_o$ can be rejected and $H_a$ accepted. Signs of the coefficients indicate a positive or negative relationship to the dependent variable. The regression coefficients are estimated though use of regression procedures contained in the Statistical Package for the Social Sciences (SPSS) program (5). The SPSS "New Regression" procedure supplies five equation-building methods: forward entry, backward elimination, stepwise selection, forced entry, and forced removal. The backward elimination procedure is utilized in this study because it is recommended for variable selection (1) and is better able to handle multicollinearity problems than the forward selection procedure (Mantel, cited in 1).

## RESULTS

Results in this study are based on application of the model to 1) the data from all 1,604 counties in the data system (RUN 1) and 2) data from the 1,249 counties having some positive level of foreign investment in farmland (RUN 2).

The SPSS backward elimination procedure dropped insignificant variables one at a time based on their contribution to the reduction of error sum of squares. The first variable deleted has the smallest contribution to the reduction of error sum of squares.

The independent variables remaining in the final equation of RUN 1, where the amount of foreign owned farmland ("AFIDAFL") is the dependent variable, are, "CNTYSTAV," "OPAVAGE," "AVGSIZE," "WEST," "PCTRENT," "PCTOP100," and "PCTFRMR." These variables are significant at less than the 5-percent level of probability. The amount of variation in foreign-owned farmland explained by these seven variables, or the square of the multiple correlation coefficient, $R^2$, is .14. Partial regression coefficients of the independent variables are listed in Table 2. The signs of the coefficients are as expected (see Table 1) except for the variables "CNTYSTAV," "OPAVAGE," and "PCTOP100." The negative coefficient for "CNTYSTAV" apparently indicates that foreign investors are not buying land in counties where farmland values are higher in comparison to Statewide farmland values. The positive coefficient for "OPAVAGE" may indicate a tendency for foreign investors to locate in long established farm areas where operators are more experienced, thus older. The negative coefficient for "PCTOP100" may indicate a desire for farms that are more than part-time operations, thus requiring more operator's labor.

When the model is applied to the 1,249 counties with a positive level of foreign-held acreage (RUN 2) and the dependent variable remains the same, "OPAVAGE" is no longer significant and "PCTRENT" is significant at slightly greater than the 5-percent level of probability. $R^2$ increases to .15. Table 2 indicates the partial regression coefficients of the variables.

Where the dependent variable is the ratio of the foreign-owned acreage to all farmland in the county ("RATIO"), the variables remaining in the RUN 1

equation are "CORP," "SOUTH," "PCTFSTCK," "PCTRENT," and "WEST." The signs of the partial coefficients for these variables are as hypothesized. All variables are significant at the 5-percent level or less. The $R^2$ is equal to .02. The regression output for these variables appears in Table 2.

In the RUN 2 equation where "RATIO" is the dependent variable, $R^2$ increases to .05. The variables in the equation are "CORP," "SOUTH," "NBRFARMS," "POPSQMI," "OPAVAGE," "PCTOP100," "WEST," and "PCTFRMR." All variables are significant at the 5-percent level or less. The signs of the partial coefficients for "POPSQMI" and "PCTOP100" were not expected. Reasons for the negative coefficient of "PCTOP100" were given in the previous discussion of the results where "AFIDAFL" was the dependent variable. Apparently "POPSQMI" has a greater negative effect on the amount of farmland in the county than on AFIDA farmland, in turn causing a positive effect on the "RATIO" variable. The results of RUN 2 are shown in Table 2.

Where the number of AFIDA records ("NUMAFIDA") is the dependent variable, the independent variables remaining after the regression procedure in RUN 1 are "NBRFARMS," "PCTSALES," "PCTFSTCK," "PCTFRMR," "PCTCOTTN," and "OPAVAGE." The $R^2$ for the equation is .05. The partial regression coefficients and their probability values are listed in Table 2. The signs of the regression coefficients are as expected except for "PCTCOTTN" and "OPAVAGE." Reasons for a positive coefficient for "OPAVAGE" were discussed previously. A positive coefficient for "PCTCOTTN" may be explained by foreign investors buying land located in counties which produce cotton but who utilize the land for other purposes.

Results of RUN 2 where "NUMAFIDA" is the dependent variable indicate "PCTCOTTN" and "OPAVAGE" are no longer significant. However, the variable "ALIEN" becomes significant at the 5-percent level. The $R^2$ for the equation

Table 2--Partial regression coefficients and probability levels a/ for independent variables in equations

| Independent variable | Dependent variable: AFIDAFL RUN 1 b/ | AFIDAFL RUN 2 c/ | RATIO RUN 1 b/ | RATIO RUN 2 c/ | NUMAFIDA RUN 1 b/ | NUMAFIDA RUN 2 c/ |
|---|---|---|---|---|---|---|
| CNTYSTAV | -516.21 (.029) | -1154.85 (.002) | - | - | - | - |
| OPAVAGE | 168.95 (.033) | - | - | -.002 (.001) | .075 (.086) | - |
| AVGSIZE | 1.05 (.000) d/ | 1.07 (.000) d/ | - | - | - | - |
| PCTCOTTN | - | - | - | - | 2.764 (.085) | - |
| PCTRENT | 3365.03 (.013) | 3633.98 (.052) | .009 (.008) | - | - | - |
| PCTOP100 | -10368.23 (.033) | -21296.48 (.017) | - | -.071 (.011) | - | - |
| PCTFRMR | -9084.32 (.015) | -20407.71 (.005) | - | -.070 (.003) | -3.736 (.001) | -5.049 (.001) |
| CORP | - | - | -.004 (.002) | -.006 (.002) | - | - |
| POPSQMI | - | - | - | .000 d/ (.050) | - | - |
| NBRFARMS | - | - | - | -.000 d/ (.014) | .001 (.000) d/ | .001 (.000) d/ |
| PCTFSTCK | - | - | .000 d/ (.051) | - | .092 (.000) d/ | .092 (.000) d/ |
| SOUTH | - | - | .006 (.000) d/ | .006 (.004) | - | - |
| WEST | 4126.50 (.000) d/ | 5243.70 (.000) d/ | .005 (.016) | .006 (.008) | - | - |
| PCTSALES | - | - | - | - | 8.804 (.000) d/ | 8.962 (.001) |
| ALIEN | - | - | - | - | - | -.908 (.027) |
| CONSTANT | -43.50 | 20157.40 | .002 | .159 | -2.369 | 3.217 |
| $R^2$ | 0.14 | 0.15 | 0.02 | 0.05 | 0.05 | 0.04 |

a/ Probability levels listed in parentheses.
b/ Includes all 1,604 counties with data.
c/ Includes only 1,249 counties with a positive level of foreign investment.
d/ Less than .001.

decreases to .04. All signs of the coefficients are as anticipated. Table 2 lists the coefficients and their probability values.

## ANALYSIS AND CONCLUSIONS

The model indicates that several of the independent variables are statistically significant in each regression equation formulated. The variable which is found significant in the most equations is "PCTFRMR," occurring in five of the six runs. "WEST" is significant in four equations. The variables "OPAVAGE," "PCTRENT," "PCTOP100," "NBRFARMS," and "PCTFSTCK," are significant in three of the equations. However, the variation in foreign investment among counties explained by the significant variables is quite low in all cases. The $R^2$ values range from .02 to .15. This result appears to indicate little or no relationship between the independent and dependent variables and, therefore, that the linear model developed provides a poor fit to the data.

Because the proportion of foreign investment variation explained by the model is very low, possible violations of the basic linear model assumptions were considered. Scatterplots generated of the dependent variables against various independent variables appeared to be linear. Analysis of residuals did not seem to reveal gross violations of the basic assumptions associated with regression analysis. Heteroscedasticity, although not marked, may be present in some error variances. Scatterplots of observed standardized residuals against certain independent variables showed a weak convergence of plotted points, an indication that the error variance is decreasing with the independent variable. Effects of possible inconstancy of error variances on the precision of the least squares estimate were not explored. Finding no gross violations of the linear model assumptions the conclusions can be made that 1) other factors need to be considered for a better explanation of the levels of foreign

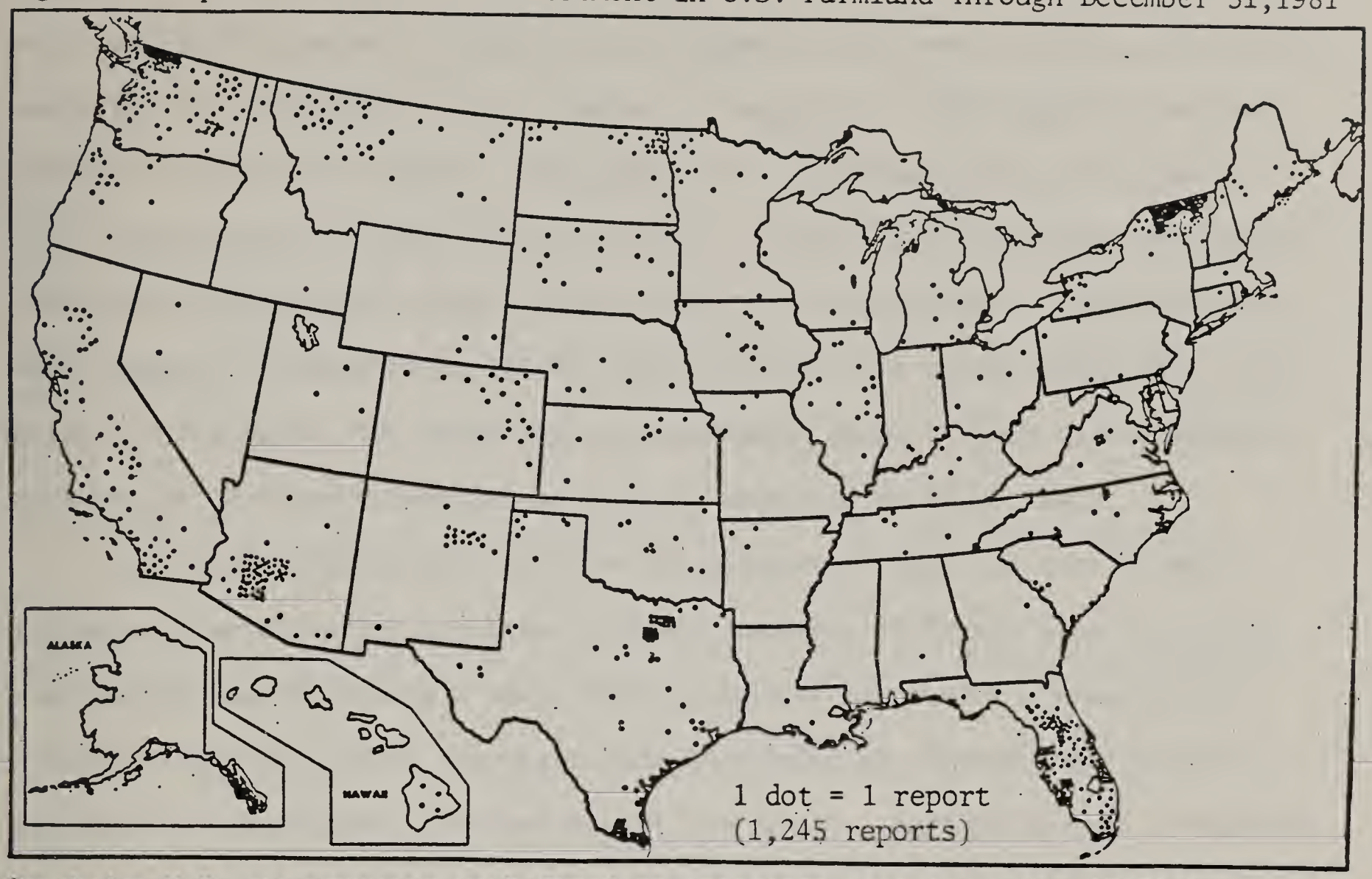
investment in farmland among counties or 2) no specific set of factors greatly influences the locational decision made by foreign investors and, therefore, the investment "occurs at random" with respect to the variables considered.

Support for these conclusions are given by several factors. Because AFIDA defines U.S. entities with a 5-percent or more non-U.S. interest as foreign, the level and location of acreage owned by these entities, in particular entities with small, noncontrolling foreign interests, would be influenced by decision-making factors affecting domestic land purchasers. Therefore, land owned by this category of foreign investor may partially account for the low explanatory powers of the selected variables in describing amounts of foreign-held acreage.

Second, examination of AFIDA records reveals some forest or nonagricultural land may have been reported as "other agricultural" land. This is particularly true for some Canadian investors who appear to have reported their recreational properties in parts of Vermont, New York, Montana, Florida, and Washington as "other agricultural" land. Figure 3, which plots by county the AFIDA reports filed by Canadians for farmland only (excluding reports from U.S. corporations with Canadian interests), indicates these areas of probable misreported recreational properties. Possible development of nonagricultural areas in Maricopa County, Arizona is speculated as the reason for the number of reports in that county. Development speculation or recreational land-use may also be a factor for the number of reports in Florida. The inclusion of nonagricultural and forest land in the AFIDA data base would affect the ability of the agricultural-oriented variables used in this study to explain the variation in foreign ownership among counties. Additionally, agricultural land purchased for developmental purposes would possess investment decision-making variables other than those used.

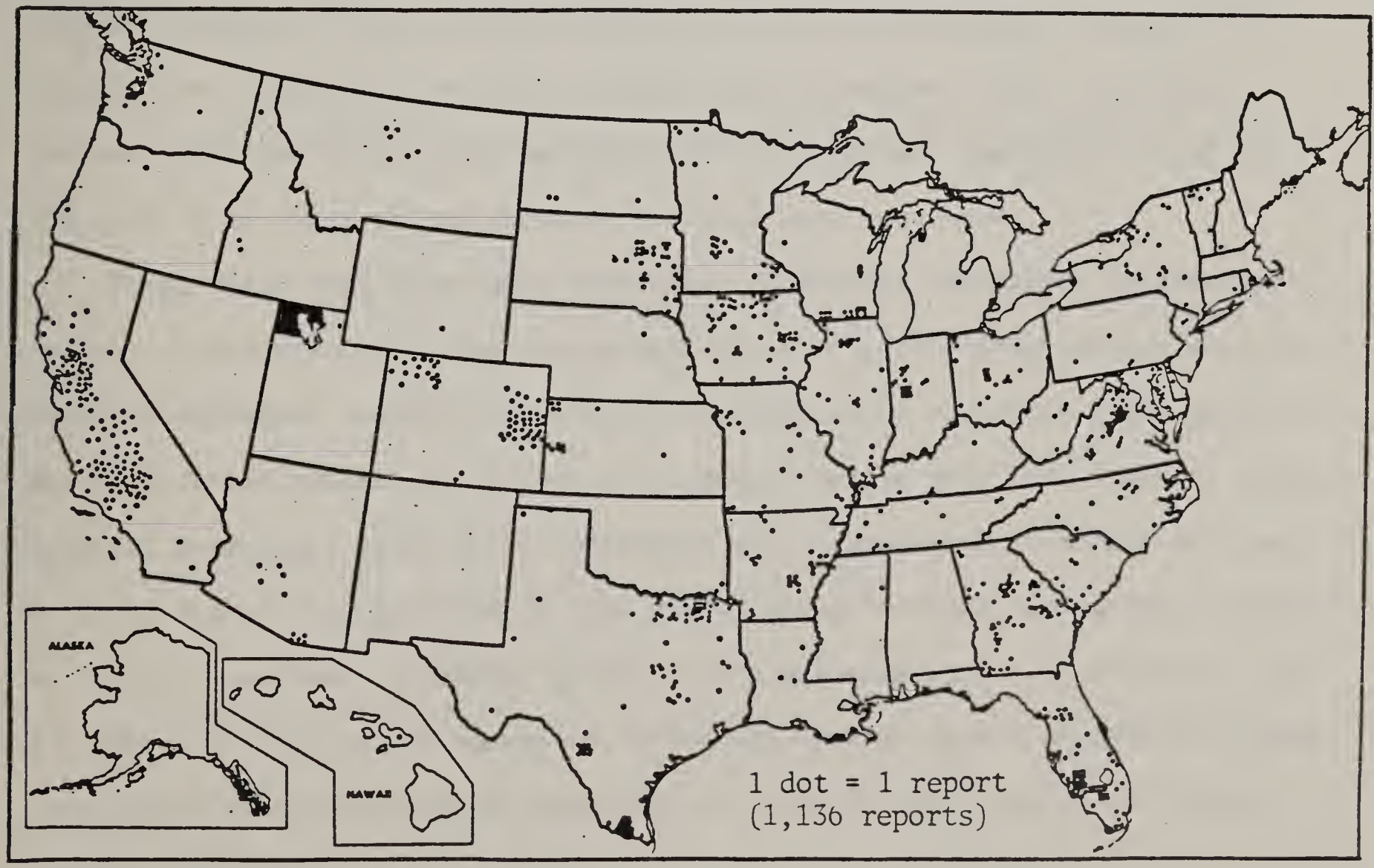
Examination of Figure 3 reveals additional insight to the nature of foreign investment. Little Canadian investment is in regions which are commonly considered heavy agricultural areas, such as the Midwest. This phenomenon may be

Figure 3--Reports of Canadian Investment in U.S. Farmland Through December 31,1981




(Excludes U.S. corporations with Canadian interests reported under AFIDA.)

Figure 4--Reports of West German Investment in U.S. Farmland Through December 31, 1981




(Excludes U.S. corporations with West German interests reported under AFIDA.)

explained by the number of States in the Midwest which have restrictions on alien ownership of agricultural land. However, a mapping of AFIDA reports from West German investors for farmland only (Figure 4), excluding acreage reported by U.S. corporations with West German interests, reveals more investment in regions considered agricultural areas than was exhibited by Canadians. Investment from West Germany is concentrated in the eastern half of the United States and a few States in the West. The heavy area of investment shown in Utah is attributable to a series of 40-acre parcels questionably reported as wheat land.

A conclusion which can be reached from Figures 3 and 4 is that foreign investors from different countries probably consider different sets of factors when making land purchases. West German investors apparently are more agriculture-oriented in their purchases than Canadians, the latter being more interested in recreational and speculative investment. Aggregating all categories of foreign investors, including those buyers investing in land for reasons other than agricultural production purposes, would most likely limit the explanatory powers of the selected variables used in this study. Although this may be true, regression analysis of West German investment only (utilizing the same model as previously described) revealed minimal increases of .01 to .08 in $R^2$ from those values obtained when all data were used.

Thus, while some geographic clustering of foreign investment is observable in maps, concentrations cannot be accounted for by conventional agricultural or economic measures. Foreign investors do not appear to represent a unique subset of farmland owners and economically seem to behave much like domestic owners. Apparent geographic patterns of investment may be explained by social and institutional factors not included in this study, examples being recreational benefits of certain locations, proximity to investor's principal place of residence, or activities of real estate agents in attracting foreign buyers to specific areas. These types of factors may be better able to predict the location of future foreign investment.

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